

WHAT IS CLAIMED IS:

1           1.       A cardiac electrode deployment device comprising:  
2           a support; and  
3           an electrode structure deployable from the support, said electrode structure  
4 including a planar region and a conformable, raised center region, wherein electrode surfaces  
5 on the planar region and on the center region are electrically isolated from each other.

1           2.       A device as in claim 1, wherein the electrode structure comprises an  
2 electrically conductive base and an electrically conductive dome attached to an electrically  
3 insulative spacer from the base.

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1           3.       A device as in claim 2, wherein the electrically conductive base is a  
2 compliant web and the conductive dome is a soft matrix attached to and projecting from the  
3 web.

1           4.       A device as in claim 3, wherein the electrode structure can be shifted  
2 between a low profile configuration where it can be intercostally introduced to a region over  
3 the heart and an open configuration where the electrode surfaces can be engaged against the  
4 heart.

1           5.       A device as in claim 4, wherein support comprises a shaft having a  
2 proximal end and a distal end and the electrode structure comprises a plurality of struts  
3 reciprocatably attached to the distal end of the shaft, said struts being retractable to a radially  
4 contracted configuration and advancable along arcuate, diverging paths to deploy the  
5 electrode surfaces to non-traumatically engage the heart when advanced thereagainst,  
6 wherein the compliant web is secured to the struts to advance the electrode surfaces when the  
7 struts are advanced.

1           6.       A device as in claim 5, wherein the compliant web is supported solely  
2 by the struts and the dome is supported solely by the web.

1           7.       A device as in claim 1, further comprising a non-conductive, fixed rod  
2 which is coupleable to the center region and advancable from a distal end of the support to  
3 urge the center region forward as the electrode surfaces are advanced against the heart.

1 8. A device as in claim 7, further comprising a spring attached to the  
2 distal end of the support to provide a spring loaded advancement of the fixed rod.

1 9. A device as in claim 1, wherein at least one of the electrode surfaces of  
2 the electrode structure comprises a plurality of electrically isolated segments and wherein the  
3 support includes separate electrical conduction paths for connecting the isolated segments of  
4 the electrode structure to an external power supply controller.

1 10. A device as in claim 1, wherein the support comprises a first  
2 electrically conductive path for connecting the electrode surface on the planar region to an  
3 external power supply controller and a second electrically conductive path isolated from the  
4 first path for connecting the electrode surface of the center region to the external power  
5 supply controller.

1 11. A system comprising:  
2 a support;  
3 an electrode structure deployable from the support, said electrode structure  
4 including a planar region and a conformable, raised center region, wherein electrode surfaces  
5 on the planar region and on the center region are electrically isolated from each other;  
6 a power supply controller; and  
7 wherein the support comprises a first electrically conductive path for  
8 connecting the electrode surface on the planar region to the external power supply controller  
9 and a second electrically conductive path isolated from the first path for connecting the  
10 electrode surface of the center region to the external power supply controller.

1 12. A system as in claim 11, further comprising a paired counter electrode.

1 13. A system as in claim 12, further comprising a switch on the power  
2 supply controller to allow a user to switch the mode of operation between bipolar functioning  
3 for sensing or pacing treatment and unipolar functioning for defibrillation treatment.

1 14. A cardiac electrode deployment device comprising:  
2 a support having a proximal end, a distal end, and a blunt tip;  
3 a first electrode structure deployable from the distal end of the support, said  
4 first electrode structure including a planar region; and

5 a second electrode structure attached to the blunt tip, said second electrode  
6 structure having a conformable, raised center region, wherein electrode surfaces on the first  
7 and second electrode structures are electrically isolated from each other.

1 15. A device as in claim 14, wherein the first electrode structure comprises  
2 an electrically conductive base and the second electrode structure comprises an electrically  
3 conductive dome.

1 16. A device as in claim 15, wherein the electrically conductive base is a  
2 compliant web and the conductive dome is a soft matrix or mesh disposed over the blunt tip.

1 17. A device as in claim 16, wherein the first electrode structure comprises  
2 a plurality of struts reciprocatably attached to the distal end of the shaft, said struts being  
3 retractable to a radially contracted configuration and advancable along arcuate, diverging  
4 paths to deploy the first electrode surface to non-traumatically engage the heart when  
5 advanced thereagainst, wherein the compliant web is secured to the struts to advance the first  
6 electrode surface when the struts are advanced.

1 18. A device as in claim 17, wherein the compliant web is supported solely  
2 by the struts and the dome is supported solely by the blunt tip.

1 19. A device as in claim 18, wherein the blunt tip extends from the most  
2 distal end of the shaft by a rod.

1 20. A device as in claim 19, wherein the blunt tip is formed from a soft,  
2 biocompatible foam.

1 21. A device as in claim 19, wherein the blunt tip is formed entirely from a  
2 soft conductive mesh.

1 22. A device as in claim 19, further comprising a force gauge,  
2 accelerometer, impedance sensor, piezoelectric crystal, or oximeter coupled to the blunt tip or  
3 dome.

1 23. A method for electrically contacting a heart, said method comprising:  
2 percutaneously introducing an electrode structure against the heart;

3 establishing a first electrically conductive path to the heart through a first  
4 electrode surface on a planar region of the electrode structure;  
5 establishing a second electrically conductive path to the heart through a  
6 second electrode surface on a raised center region of the electrode structure, wherein the first  
7 and second electrode surfaces are electrically isolated from each other; and  
8 establishing an electrical circuit between the first and second electrically  
9 conductive paths.

1 24. A method as in claim 23, wherein establishing a circuit comprises  
2 taking an EKG of the heart.

25. A method as in claim 23, wherein establishing a circuit comprises  
pacing the heart.

26. A method as in claim 23, wherein establishing a circuit comprises  
applying energy in a bipolar fashion through the first and second isolated electrode surfaces.

27. A method as in claim 23, wherein establishing the first electrically  
conductive path comprises engaging an electrically conductive compliant web against the  
heart and establishing the second electrically conductive path comprises engaging a soft  
dome-like matrix coupled to and projecting from the web against the heart.

1 28. A method as in claim 27, further comprising advancing the dome-like  
2 matrix to protrude distally of the compliant web.

1 29. A method as in claim 23, wherein the first electrically conductive path  
2 comprises engaging an electrically conductive compliant web against the heart and  
3 establishing the second electrically conductive path comprises engaging a soft dome-like  
4 matrix disposed over a blunt tip against the heart.

1 30. A method as in claim 29, wherein introducing the electrode structure  
2 comprises bluntly dissecting intercostal tissue with the blunt tip.

1 31. A method as in claim 23, further comprising compressing the heart by  
2 contacting the electrode structure against the heart and pressing the electrode structure to  
3 cause compression of the heart.

1 32. A method as in claim 31, wherein compression is in an anterior-  
2 posterior direction.

1 33. A method as in claim 31, wherein the electrode structure is introduced  
2 intercostally in a low profile configuration and subsequently expanded over the heart.

1 34. A method as in claim 31, wherein compressing the heart comprises  
2 repetitively compressing the heart at from 40 to 160 repetitions per minute.

1 35. A method as in claim 23, further comprising contacting a patient's  
2 back with a counter electrode and applying defibrillation energy between the electrode  
3 structure on the heart and the counter electrode on the patient's back to defibrillate the heart.

1 36. A method as in claim 35, wherein applying defibrillation energy  
2 comprises switching the mode of operation on a power supply connected to the electrode  
3 structure and the counter electrode.

1 37. A kit comprising;  
2 a cardiac electrode deployment device; and  
3 instructions for use setting forth a method according to claim 23.

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